



Kentucky Water Well Drillers Quarterly Newsletter

A Publication of the Groundwater Section
 of the Watershed Management Branch
 Kentucky Division of Water
 Department for Environmental Protection

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President-elect Kevin Moses addressing annual tradeshow attendees. Photo taken by DOW.

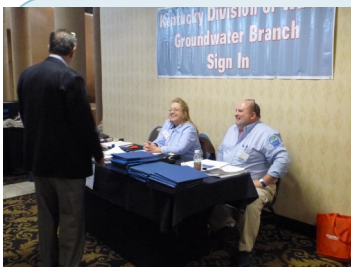
2014 Annual Kentucky Ground Water Association Tradeshow and Workshop was a roaring success

by Scotty Robertson

The Annual Kentucky Ground Water Association Tradeshow and Workshop was held in Louisville, Kentucky at a new venue this year. It was held at the Holiday Inn East located off Hurstbourne Lane in Louisville. Over 100 drillers attended the show along with about 60 vendors. Everyone interviewed like the new location and the new venue addressed many of the complaints voiced by drillers in response to the previous tradeshow location. The rooms were comfortable. The meeting rooms were spacious and the attendees had access to refreshments and free wifi. The vendors liked the layout of the lobby area for setting up their booths and displays, and the meals served to the drillers were delicious.

The hotel provided plenty of parking and there was easy access to the hotel from the interstate. Shuttle services were provided to local area restaurants and stores free of charge. The staff was gracious and helpful. All seemed to enjoy this years events. The Kentucky Ground Water Association voted to make the Holiday Inn East the location of the 2015 Annual Tradeshow and Workshop.

If you would like to be involved with getting an amendment passed to ensure protection of Kentucky's greatest natural resource, groundwater, we urge you to attend the board meetings of the Kentucky Ground Water Association and the Kentucky Water Well Drillers Certification Program.



Scotty Robertson (right) and Cindy Sutton talk with James Parson at the drillers workshop. Photo by DOW staff



Springtime at the Kentucky State Capitol. Photo by Governor's Staff



Kentucky General Assembly
Photo by LRC staff

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Program Coordinator's Notes by Scotty Robertson

Please join me in welcoming Tekoyia Brown as our new administrative coordinator for the Water Well Drillers Certification Program. Many of you got the chance to meet Tk (T-Kay) at the Annual Kentucky Ground Water Association Trade Show and Workshop.

She is an outgoing and energetic employee who brings a fresh perspective to the program. Tk will be assisting with processing water well drillers certification renewals and with many other activities including well inspections, use of the downhole camera, and with other duties as assigned.

Changing the subject here, I would like to talk about

change. We all know everything changes with the times as so with the Drillers Certification Program. For several years we have made available to you online renewals, yet few of you choose to use this service.

The drilling regulations were updated in 2008. When was the last time you read them? If you attended the annual workshop and trade show, you got a package with a copy of the updated regulations. This package also contained copies of all the updated well construction forms, variance request forms and a renewal application. Yet many of you are still submitting well construction records on old forms. There is a uniform

well construction record for all new well constructions. There is a well modification and plugging form for those that abandon or modify a well. Finally, there is a combined well construction and plugging record for temporary wells. Please use this record only for temporary monitoring wells. Do not use this form for new permanent water wells or monitoring wells to be installed longer than three days.

Lastly, learn how to properly use your GPS meters, get an app for your cell phone, or submit a topographic map. Check the coordinates you submit to make sure they are correct. Make detailed site sketches and tie them to something permanent that can be found.

Geothermal Bill Fails to Get Out of Senate Committee in 2014 General Assembly Session by Scotty Robertson

Danny Kelly reported that the amendment to KRS 223.400-460, to allow certification of geothermal borehole drillers, was introduced into the senate committee in Natural Resources and Energy by Sen. Stan Humphries as SB102 on Jan. 29, 2014. However, despite all the efforts of the Kentucky Ground Water Association and the members of the Kentucky Well Drillers Certification Board, the amendment never received a reading during the 2014 session.

According to Kelly the bill received heavy opposition by a group of geothermal drillers and several senators from northern Kentucky.

This group was able to persuade the committee members not to give the amendment a reading. Therefore, SB 102 died in committee.

The Kentucky Ground Water Association is forming a workgroup to address solutions for getting the bill through the next legislative session. They are asking representatives of the geothermal borehole drilling community along with HVAC contractors and well drillers to attend the next meeting of the Kentucky Well Drillers Certification Board.

The Well Drillers Certification Board will meet August 22, 2014 at the General Butler State Park near Carrollton, Kentucky at 9:00 a.m. The Kentucky Ground Water Association hopes to iron out prob-

lems with geothermal drillers and HVAC contractors to aid in passage of the amendment in time for the 2015 General Assembly.

If you would like to get involved with passage of an amendment to ensure protection of one of Kentucky's greatest natural resources, groundwater, we urge you to attend the board meetings of the Kentucky Ground Water Association and the Kentucky Well Drillers Certification Board. For More information on this issue please contact David Jackson or Scotty Robertson at the Kentucky Division of Water in Frankfort, Kentucky at 502-564-3410 or by email:

***DavidA.Jackson@ky.gov or
Scotty.Robertson@ky.gov***

Renewal Time by Scotty Robertson

It is that time of year again. Time to renew your driller certification.

All water well and monitoring well driller certifications expired on June 30, 2014. The renewal period began May 1, 2014 and expires August 31, 2014.

If you do not renew your certification you will not be able to practice water well drilling in Kentucky after the August deadline. Failure to renew two years in a row will require retaking state and national examinations.

The cost for renewal is \$100 payable to the Kentucky State Treasurer.

To renew you must show proof of liability insurance, five CEUs of training and a current surety bond in the amount of \$5000.

You can submit your renewal certification application via the mail to:

Water Well Drillers Certification Program
Kentucky Division of Water
200 Fair Oaks Lane
Frankfort, KY 40601

Or you can renew online if your, insurance, training and

bond are up to date in the DOW's database. Just go to the well drillers website and click the e-Pay button, like the one shown below, to recertify on line.



Drillers attending class at the workshop. Photo taken by DOW staff



White House Report Says Climate Change Will Disrupt Groundwater Availability by National Ground Water Association (NGWA)

Climate change is expected to affect water demand, groundwater withdrawals, and aquifer recharge, and reduce groundwater availability in some areas, according to a White House report released on May 6.

The third U.S. National Climate Assessment report states surface water and groundwater supplies in some regions are already stressed by increasing demand at a time that these systems are experiencing drought and declining groundwater recharge. In some regions, particularly the southern United States and the Caribbean and Pacific islands, climate change is increasing the likelihood of water shortages and competition for water. Water quality is diminishing in many areas, particularly due to increasing sediment and contaminant concentrations after heavy downpours.

Total freshwater withdrawals (including water withdrawn and consumed as well as water that returns to the original source) and consumptive uses have leveled off nationally since 1980 at 350 billion gallons of withdrawn water and 100 billion gallons of consumptive water per day, despite the addition of 68 million people from 1980 to 2005. Irrigation and electric power plant cooling withdrawals account for approximately 77 percent of total withdrawals, municipal and industrial for 20 percent, and livestock and aquaculture for 3 percent. Most thermoelectric withdrawals are returned back to rivers after their use for power plant cooling, while most irrigation withdrawals are consumed by the processes of evapotranspiration (evaporation and loss of moisture from leaves) and plant growth.

Thus, consumptive water use is dominated by irrigation (81percent) followed distantly by municipal and industrial (8 percent) and the remaining water uses (5 percent). The largest withdrawals occur in the drier western states for crop irrigation. In the east, water withdrawals mainly serve municipal, industrial, and thermoelectric uses. Some of the largest demand increases are projected in regions where groundwater aquifers are the main water supply source, such as the Great Plains and parts of the Southwest and Southeast. The projected water demand increases combined with potentially declining recharge rates threaten the sustainability of many aquifers.



Water storage and pressure tank displayed at tradeshow. Photo by DOW staff



Drillers waiting for presentation to begin. Photo by DOW staff



Drill rig display located in vendor's area. Photo by DOW staff

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Do you have a water well on your property?

Adapted from Louisville Water Company WHPP 906

Many homeowners in Kentucky have water wells located on their property that were once a water supply, or is still actively being used. Even if the well is not being used, it should be maintained properly. Proper maintenance of all wells prevents contamination of the ground water through the well opening or well casing. Taking care of your water well not only protects your health it protects your neighbor's health too.

Some well locations are easily identified, however others may be harder to find. They may be located in basements and crawlspaces, may have no visible power supply, and others may be buried. In some cases all that is visible will be a vent pipe protruding a few inches above ground.

To determine if your home has a well there are various actions that you can take. Ask your neighbors about the history of the neighborhood, visit the Kentucky Geological Survey website to access well location and spring data, or contact the Kentucky Division of Water Groundwater Section.

Other ways to find older wells include:

- Look for a circular ring in cement, or a patch on the floor of a basement or sidewalk.
- Look for a basement off-set, look under porches, steps, and decks, or look in old out buildings.
- Look for a low spot in the yard or a circular depression that is damp.
- Look for water system components, such as pressure tanks, softeners, pump control boxes or electrical wiring, or shadow lines on basement floors or walls, showing where these components may have rested.

If you find a water well on your property, please contact the Kentucky Division Water Groundwater Section at (502)-564-3410. Groundwater Section personnel will schedule a well inspection and provide information on maintenance, upkeep, and proper abandonment procedures for the well.

Adapted from Louisville Water Company WHPP brochure 906 and DOW WHPPs



Well casing and well cap for private water well. Photo by DOW staff.



Tile casing and concrete lid private water well. Photo by DOW staff.



Private water well and pressure tank. Photo by DOW staff



Open well with steel casing. Photo by DOW staff.



Open well house with well, piping and pressure tank. Photo by DOW staff.



Scotty Robertson (left) inspecting hand dug well with siphon pump. Photo by DOW staff.



Cinder block well house in Western Kentucky. Photo by DOW staff.

It's the Rainy Season Be Prepared for Flooding

Adapted from Louisville Water Company WHPP 906

There are certain things household water well owners should know during this flooding season about how to protect their wells and their water quality. Flooding by surface water can threaten groundwater quality and the condition of a well system. The vulnerability of a well can vary depending on the area in which one's property is located or even the specific spot on a parcel of property where the well is installed.

Following are steps household well owners can take before, during, and after a flood to prevent, minimize, or recover from well flooding.

Before a flood threatens

- Assess the water well to determine if it might be vulnerable to flooding. Considerations include:
 1. Wellhead location — is it on high ground, which is least vulnerable to flooding; flat ground; or low-lying ground, which is most vulnerable to flooding?
 2. Construction — is the well constructed to meet applicable regulations, such as the proper height for the well casing and proper grouting of the well casing to minimize the potential for floodwater infiltration?
 3. Seals — are the well system's sanitary seals intact to resist floodwater infiltration?

When flooding is imminent

- Ask a certified water well driller what precautions should be taken, if any, to minimize the chances of floodwater entering the well.
- Also, well owners who are vacating their property due to flooding should shut off the power to the well pump before leaving.

After well flooding

- Household water well owners should call a certified water well driller for an assessment of the well system.
- Arrangements for an alternative water supply such as bottled water should be made until the well has been cleaned, serviced, disinfected, tested, and the water proven safe to drink.
- Well owners should not attempt to service their wells due to safety risks, including electrocution, and the potential to create more damage.

Even under normal circumstances, proper disinfection of a water well can be difficult for the untrained. The proper type and amount of disinfectant, its distribution throughout the system, contact time with the water and well components, and the well's cleanliness can impact the effectiveness of water well disinfection.

When a well is flooded, disinfection can become even more problematic due to the introduction of organic matter into wells, which can react with disinfectants to create disinfection byproducts considered a health risk.

Flooding may cause debris to enter the well, requiring a thorough cleaning of the well system.

Also, because floodwater can pick up some of whatever is on the ground surface — or contain substances that have spilled into the floodwater, such as chemicals in storage bins or tanks — disinfection of the water well may not be enough. Extensive pumping of the well and the aquifer may be required to eliminate contamination. After a flood emergency, check with local emergency officials, Kentucky Division of Water, or the county health department about any area-specific water testing that should be done.

For all these reasons and more, it's recommended a certified water well driller should be engaged to inspect, service, clean, and disinfect a well after a flood. Water testing should be done by a certified drinking water testing lab.



Kevin (father) and Amos (son) Moses disinfecting a water well. Photo by DOW staff



Amos Moses pouring bleach down water well. Photo by DOW staff



Kevin Moses recirculation water in well, while staying dry under umbrella during local rain event. Photo by DOW staff



Amos Moses sampling well for bacteria. Photo by DOW staff

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What can you do to protect your well from contamination? Adapted from Louisville Water Company WHPP 906

Use these simple best management practices (BMP) to protect your water supply:

- Inspect exposed parts of the well for
 - ⇒ Cracked or corroded well casing
 - ⇒ Broken or missing well cap
 - ⇒ Damage to protective casing
 - ⇒ Settling and cracking of surface seals
- Slope the area around the well so that surface water drains away from the well
- Provide a well cap or a sanitary seal to prevent unauthorized use or entry of the well
- Avoid mixing pesticides, fertilizers, herbicides, degreasers, fuels, and other pollutants near the well
- Do not locate any potential pollutant activity up slope, or near the well
- Do not cut off well casing below the ground surface, as this leaves the well more vulnerable to contamination.
- Keep accurate records of any well maintenance, such as disinfection or sediment removal, that might require use of chemicals in the well
- Use a Kentucky Certified Water Well Driller for any new well construction or modification and proper well abandonment
- Do not use wells for disposal of any chemicals, wash water, etc.
- Wells should be located a safe distance from potential sources of contamination. Kentucky uses several specified distances, and recommends certain distances, for specific activities



Properly tagged water well.
Photo by DOW staff

Minimum* Distances from Potential Pollutants Required by Kentucky Law	
Lateral Sources of Contamination	Minimum Distances
Leaching Pit	100 Feet
Petroleum Storage Tank	100 Feet
Grave or Cemetery	75 Feet
Manure Pile, Animal Waste Storage, or Confined Animal Feeding Operation	75 Feet
Wastewater Treatment Disposal System	75 Feet
Side Wall of Lateral Trench, Bed, or Lagoon	70 Feet
Geothermal – Closed Loop, Un-grouted	70 Feet
Water Supply Well	50 Feet
Septic Tank or Sewer Line	50 Feet
Livestock Pen, Corral, or Stable	50 Feet
Surface Water Body	25 Feet
Geothermal – Closed Loop, Grouted; Abandoned Water Well Grouted	20 Feet
Property Lines, Utility Lines, or Roadway Right of Way	10 Feet

If your well is used as a source of drinking water, you should disinfect the well at least once or twice a year, using bleach or hypochlorite granules.

How much bleach is required to disinfect a drinking water well?

Adapted from Louisville Water Company WHPP 906

First you need to calculate the amount of water in your well. As long as your depth to water remains fairly stable, you can use the same numbers each time you disinfect the system. To do this you need to know the diameter of the inside of the casing and the approximate number of feet of water standing in your well.

If you know these numbers, use the chart below to determine how much chlorine you need. This chart also assumes that your plumbing system contains about 100 gallons of water which is included in this chart. If your well is different from those in this chart, you can visit the DOW website at <http://water.ky.gov/groundwater/Pages/FormsApplications.aspx> and assess the Water Well Owner's Guide to calculate the exact amount for your well and plumbing system.

Feet of Standing Water in The Well	4-inch inside casing diameter	5-inch inside casing diameter	6-inch inside casing diameter	7-inch inside casing diameter	8-inch inside casing diameter	10-inch inside casing diameter
10 feet	1 quart + 2 1/3 cups	2 1/3 cups + 2 2/3 cups	1 quart + 2 7/8 cups	2 2/3 cups + 3 1/4 cups	1 quart + 3 5/8 cups	2 7/8 cups + 1/2 cups
20 feet	1 quart + 2 3/4 cups	1 quart + 3 1/4 cups	1 quart + 3 3/4 cups	2 quarts + 1/2 cup	2 quarts + 1 1/8 cups	2 quarts + 1 1/2 cups
30 feet	1 quart + 3 1/4 cups	2 quarts	2 quarts + 6/8 cups	2 quarts + 5/8 cup	2 quarts + 2 3/4 cups	3 quarts + 1 1/8 cups
40 feet	1 quart + 3 1/2 cups	2 quarts + 1/2 cups	2 quarts + 1 1/2 cups	2 quarts + 7/8 cup	3 quarts + 1/4 cup	3 quarts + 3 3/4 cups
50 feet	2 quarts	2 quarts + 1 cup	2 quarts + 2 1/2 cups	3 quarts	3 quarts + 1 7/8 cups	4 quarts + 2 1/4 cups
60 feet	2 quarts + 1/3 cups	2 quarts + 1 2/3 cups	2 quarts + 3 1/4 cups	3 quarts + 1/4 cup	3 quarts + 3/8 cup	5 quarts + 2/3 cup
70 feet	2 quarts + 3/4 cups	2 quarts + 2 1/4 cups	3 quarts + 1/8 cups	3 quarts + 1 7/8 cups	4 quarts + 1 cup	5 quarts + 3 1/8 cups
80 feet	2 quarts + 1 1/8 cups	2 quarts + 2 7/8 cups	3 quarts + 1 cup	3 quarts + 3/8 cup	4 quarts + 2 1/2 cup	6 quarts + 6/8 cup
90 feet	2 quarts + 1 1/2 cups	2 quarts + 3 1/2 cups	3 quarts + 2 cups	4 quarts + 7/8 cup	5 quarts + 1/8 cup	7 quarts
100 feet	2 quarts + 2 cups	3 quarts + 1/8 cups	3 quarts + 2 7/8 cups	4 quarts + 2 cups	5 quarts + 1 5/8 cups	7 quarts + 2 1/2 cups
Chlorine/10 ft. for more than 100 ft of water	3/8 cups	5/8 cups	7/8 cups	1 1/4 cups	1 1/2 cups	2 1/2 cups

Diagram shows approximate amounts of straight laundry bleach needed to achieve ~200-PPM chlorine in the well and plumbing system rounded to the nearest 1/8 of a cup. Chart assumes 100 gallons of water in the home pipes, pressure tank, and water heater. For wells with diameters between those shown above, use the next larger size chart (4.5-inch use 5-inch). **Be sure to use only straight laundry bleach (5 1/4 % chlorine) (usually the cheapest), bleaches that have scents, fabric softeners, water conditioners, or color enhancers should never be used in a water well. Double the amounts shown if treating the system for Iron and Sulfur Bacteria to achieve ~400-PPM chlorine.**

You should also have the well tested once a year for Total Coliforms and E. Coli. Contact your local health department to see if they can perform this yearly test. If your drinking water well is located closer than the required or recommended distance to the specific contaminants listed in the table on Page 6, your well will need to be treated and tested more often.

NGWA and EPA Discuss Using Geothermal Heat Pumps to Meet Air Emission Standards in Upcoming Rule by National Groundwater Association

In an April meeting with the U.S. Environmental Protection Agency, NGWA representatives briefed agency staff on how geothermal heat pump (GHP) systems can reduce energy use and air pollution.

The discussion took place in advance of upcoming EPA rulemaking that will address greenhouse gas emissions from existing power plants. The Agency was interested in the technology, how it could be part of the upcoming rulemaking, and how states are incorporating GHP systems in their state programs now. The EPA will establish guidance to the states on greenhouse gas emissions from existing power plants, but each state will develop its own implementation plans.

The state implementation plans are to be submitted to the EPA by the end of June 2016 with emission reductions set to phase in by 2020. The EPA indicated it intends to provide the states with significant flexibility on exactly how greenhouse gas emission reductions will be achieved, but will require provable results.

NGWA and Geothermal Exchange Organization representatives had an opportunity to engage directly with EPA staff involved in the rulemaking and provide follow-up information. Plans are underway to meet with the Office of Management and Budget where the EPA's proposed rule is currently under review prior to an expected June 2014 release.

Reprinted from NGWA Electronic Newsletter



All photographs used in this publication were taken by either Scotty Robertson, Tekoyia Brown or David Jackson.

All articles not written by DOW personnel are published with the written consent of the NGWA, Louisville Water Company and the Water Systems Council.

Melody Burgess (left), Scotty Kelly (back) and Todd Mills (right) enjoying the 2014 tradeshow.
Photo by DOW staff

A useful link to the National Geologic Map Database:

http://ngmdb.usgs.gov/ngmdb/ngmdb_home.html

The link below goes straight to the viewer; you can roll your mouse wheel to zoom in just like Google maps:

<http://ngmdb.usgs.gov/maps/mapview/>